UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/894,136	06/29/2001	Linda J. Rankin	219.40018X00	5744

7590 09/19/2005

Jeffrey B Huter
Blakely Sokoloff Taylor & Zafman LLP
12400 Wilshire Boulevard
Seventh Floor
Los Angeles, CA 90025

EXAMINER	
PHAN, TRI H	

ART UNIT	PAPER NUMBER
2661	

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/894,136	RANKIN ET AL.	
	Examiner	Art Unit	
	Tri H. Phan	2661	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment/Arguments

1. This Office Action is in response to the Response/Amendment filed on June 13th, 2005. Claims 1-25 are now pending in the application.

Claim Objections

2. Claim 11 is objected to because of the following informalities:

In regard to claim 11, lines 2-3; it recites limitations "... flits are interleaved when ... available in one channel, one channel or is receiving backpressure from a receiver" is vague and unclear because the examiner do not know what it means for "one channel, one channel or is receiving ...".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 7-10, 12, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by **Joseph et al.** (U.S.6,628,615; hereinafter refer as '**Joseph**').

- In regard to claims 7 and 21, **Joseph** discloses in Figs. 1-7 and in the respective portions of the specification about the apparatus and method for transferring data (see fig. 1), which comprise connecting the first node and the second node with the physical connection (see figs. 1, 4-5; where the 'first node' can be the source node or destination node and the 'second node' can be the destination node or source node); connecting one end of the physical connection to one end of at least two channels and connecting the opposite end of the physical connection (see figs. 1, 2, 4 and 5 'connections 109-111, 113, 115 and 117 in fig. 1; network 206, 406 and 506 in figs. 2, 4, 5') to the other end of the at least two channels (for example see col. 6, lines 59-67; where each channel connects two end points of different system nodes as disclosed in figs. 2, 4 and 5; col. 2, lines 4-13; col. 5, lines 15-20); and interleaving flits from the two channels along the physical connection (see col. 6, lines 59-67; where the flits are defined in col. 1, lines 37-46).

- Regarding claims 8-9, in addition to features in base claim 7 (see rationales pertaining the rejection of base claim 7 discussed above), **Joseph** further discloses about reforming the flits into packets at the other end of the channels (for example see fig. 5; col. 6, lines 55-58); storing the reformed packets in queues for transfer to the processor bus (for example see fig. 5; col. 6, lines 55-58; col. 8, lines 14-22).

- In regarding claims 10 and 12, in addition to features in base claim 9 (see rationales pertaining the rejection of base claim 9 discussed above), **Joseph** further discloses wherein the processor bus transfers data in the different type of resource sharing paradigm than the physical connection (for example see figs. 4-5; col. 7, line 64 through col. 8, line 6); and wherein more than two channels are connected to the physical connection (for example see fig. 2; col. 6, lines 59-67).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-6, 11,13-20, and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Joseph et al.** (U.S.6,628,615; hereinafter refer as '**Joseph**') in view of **Walsh et al.** (U.S.5,329,521; hereinafter refer as '**Walsh**').

- In regard to claims 1 and 17, Joseph discloses in Figs. 1-7 and in the respective portions of the specification about the apparatus (see fig. 2 'two level virtual channel network interface 103-105, 116-119') for transferring data packets between nodes of the switched fabric architecture (see fig. 1, col. 4, lines 22-36); which comprises the first node (see figs. 4-5 where the 'first node' can be the source node or destination node) including the first end of the first

channel and the first end of the second channel (for example see col. 6, lines 59-67; where each channel connects two end points of different system nodes as disclosed in col. 5, lines 15-20); the second node (see figs. 4-5 where the 'second node' can be the source node or destination node) including the second end of the first channel and the second end of the second channel (for example see col. 6, lines 59-67; where each channel connects two end points of different system nodes as disclosed in col. 5, lines 15-20); the physical connection (see figs. 1, 2, 4 and 5 'connections 106-108, 120, 122, 124, 109-111, 113, 115 and 117 in fig. 1; network 206, 406 and 506 in figs. 2, 4, 5') joining the first node and the second node through which signals of both the first channel and the second channel are carried (see figs. 2, 4 and 5; col. 2, lines 4-13). Joseph does disclose about the controller for controlling the request and response transactions for the node 'source or destination node', e.g. "being in communication" as disclosed in col. 5, lines 61-63; and "controlling interleaving of data from the two channels through the physical connection" as disclosed in col. 3, line 40-48; col. 6, lines 59-67; but fails to explicitly disclose separate controller for each channel, e.g. "first/second controllers". However, such implementation is known in the art.

For example, **Walsh** discloses an apparatus (Fig. 1) for transferring data packets comprising: a first node (Fig. 1 @14 &18 are considered a single node) including a first end of a first channel (Fig. 4 @ 32) and a first end of a second channel (Fig. 4 @ 34) a second node (Fig. 1 @ 16 & 20 are considered a single node) including a second end of a first channel (Fig. 4 @ 32, since the two nodes are the same equipment at a different location) and a second end of a second channel (Fig. 4 @ 34); a physical connection joining said first node and said second node through which signals of both said first channel and said second channel are carried (Fig. 1@ 10

&12, physical connections); a first controller (Fig. 4 @ 36, LAN controller) connected to said first end of said first channel (Fig. 4 shows LAN controller 36 connected to first end of 32) and a second controller (Fig. 4 @ 38, LAN controller) connected to a first end of said second channel (Fig. 4 shows LAN controller 38 connected to first the end of 34), said first controller and said second controller being in communication (Fig. 2 shows connection between controllers) and controlling interleaving of data through said physical connection (col. 3, lines 43-49, both controllers interleave data through link 10 and 12).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to use each controller for different channels such as transmitting channels and receiving channels as taught by **Walsh** at the **Joseph**'s source node, for the purpose of reduce latency in processing data with multiprocessor system as disclosed in col. 1, lines 12-15. The motivation being that this can improve the performance of data transmission through the network.

- Regarding claims 2 and 3, in addition to features in base claim 1 (see rationales pertaining the rejection of base claim 1 discussed above), **Joseph** does disclose about the controller for controlling the request and response transactions for the node ' source or destination node', e.g. "*being in communication*" as disclosed in col. 5, lines 61-63; and "*controlling interleaving of data from the two channels through the physical connection*" as disclosed in col. 3, line 40-48; col. 6, lines 59-67; but further fails to explicitly disclose separate controller for each channel, e.g. "*third/fourth controllers*". However, such implementation is known in the art.

For example, **Walsh** further discloses a third controller (Fig. 4 @ 36, LAN controller; since the two nodes are the same equipment at a different location, the first node Fig. 1 @ 14 & 18, is the same as the second node Fig. 1 @ 16 & 20) connected to the second end of the first channel (Fig. 4, LAN controller 36 connected to the first end of 32) and a fourth controller (Fig. 4 @ 38, LAN controller) connected to the second end of the second channel (Fig. 4, LAN controller 38 connected to the first end of 34), said third and fourth controllers being in communication with each other (Fig. 2 shows connection between controllers).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to use each controller for different channels such as transmitting channels and receiving channels at the destination node as taught by **Walsh** at the **Joseph**'s source node, for the purpose of reduce latency in processing data with multiprocessor system as disclosed in col. 1, lines 12-15. The motivation being that this can improve the performance of data transmission through the network.

- In regard to claims 4 and 5, in addition to features in base claim 1 (see rationales pertaining the rejection of base claim 1 discussed above), **Joseph** further discloses about the queue ('frame buffer 307 and 309' or 'packet buffer 312' in fig. 3) for receiving data packets from the second end of the first channel and the second end of the second channel and for delivering the packets to the processor bus ('interconnection 109-111, 113, 117, and 115' in fig. 1); wherein the processor bus carries data according to the different type of resource sharing paradigm than the physical connection (col. 7, line 64 through col. 8, line 6).

- Regarding claim 6, in addition to features in base claim 1 (see rationales pertaining the rejection of base claim 1 discussed above), **Joseph** does disclose about the separate wire for each direction ("*second physical connection*") on bi-directional links (for example see col. 7, lines 38-41).

- In regard to claim 11, in addition to features in base claim 7 (see rationales pertaining the rejection of base claim 7 discussed above in part 4 of this office action), **Joseph** further disclose wherein flits are interleaved when there is no valid data available in one channel (for example see col. 8, lines 1-6; where the flit fragmentation is minimized by adaptive optimization).

- Regarding claims 13 and 25, Joseph discloses in Figs. 1-7 and in the respective portions of the specification about the switched fabric architecture system (see fig. 1), which comprises the first node (see figs. 4-5 where the 'first node' can be the source node or destination node); the second node (see figs. 4-5 where the 'second node' can be the source node or destination node); the physical connection connecting the first node to the second node (see figs. 1, 2, 4 and 5 'connections 109-111, 113, 115 and 117 in fig. 1; network 206, 406 and 506 in figs. 2, 4, 5'); the processor bus connected to the second node (see figs. 1, 4-5; network 406, 506); the first data channel and the second data channel each having the first end in the first node and the second end in the second node, and both channels being carried by the physical connection (for example see col. 6, lines 59-67; where each channel connects two end points of different system nodes as disclosed in col. 5, lines 15-20); and channels carrying data packets divided into flits (see col. 7,

lines 1-15), with flits from both channels being interleaved (see col. 1, lines 37-46) in the physical connection without bubbles (for example see col. 8, lines 1-6; wherein, it is obvious that the adaptive optimization minimizes the flit fragmentation, e.g. "*without bubbles*").

- In regard to claims 14-16, in addition to features in base claim 13 (see rationales pertaining the rejection of base claim 13 discussed above), **Joseph** further discloses about reforming the flits into packets in second node for transfer (for example see fig. 5; col. 6, lines 55-58; col. 8, lines 14-17); wherein data is transferred from the first node to the second node with one type of resource sharing paradigm and transferred from the second node to the processor bus with the second type of resource sharing paradigm (for example see figs. 4-5; col. 7, line 64 through col. 8, line 6); and wherein the second node includes queues for holding the reformed packets (for example see figs. 5, 7; col. 6, lines 55-58; col. 8, lines 14-22).

- Regarding claims 18-20 and 22-24, in addition to features in base claims 17 and 21 (see rationales pertaining the rejection of base claims 17 and 21 discussed above), **Joseph** does disclose about the method and apparatus for improving the performance of data transmission through the network connected multiprocessor systems (see col. 1, lines 12-23) through the use of "flits" (see col. 1, lines 37-46), but fails to explicitly disclose the architecture is InfiniBand, or NGIO or FIO architecture. However, the InfiniBand, or NGIO or FIO architecture is well known in the art, which are used for multi-node system in computer networks. Therefore, it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to

use the InfiniBand, or NGIO or FIO architecture as complied with the multiprocessor system networks as taught by **Joseph** for transferring data as system engineering choices.

Response to Amendment/Arguments

7. Applicant's arguments filed on June 13th, 2005 with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Acharya, Yatin R. (U.S.6,459,698) and **Burton et al.** (U.S.6,778,548) are all cited to show devices and methods for improving the performance of data transmission in the communication architectures, which are considered pertinent to the claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tri H. Phan, whose telephone number is (571) 272-3074. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chau T. Nguyen can be reached on (571) 272-3126.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(571) 273-8300

Hand-delivered responses should be brought to Randolph Building, 401 Dulany Street, Alexandria, VA 22314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office, whose telephone number is (571) 272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BRIAN NGUYEN
PRIMARY EXAMINER

Tri H. Phan
September 18, 2005